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TITLE

REPORT OF PINE BEETLE SURVEYS ON THE WARM SPRINGS INDIAN RESERVATION, OREGON SEASONS OF 1941 AND 1942

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April 1943

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SUBJECT—

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REPORT OF PINE BEETLE SURVEYS

ON THE

WARM SPRINGS INDIAN RESERVATION, OREGON

SEASONS OF 1941 AND 1942

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ABSTRACT

A. The 1940 and 1941 Infestation (Complete Records)

1. Primary insect - Western pine beetle in ponderosa pine.
2. Estimated total pine timber killed -

	No. Trees	Volume (BM)	Volume Per Acre	Percent of Stand
1940	51,000	32,000,000	98	1.5
1941	30,000	20,000,000	62	0.9

3. Classification of infestation - "Very severe epidemic" over most of reservation in 1940 and "light" to "severe epidemic" in 1941.
4. Trend of infestation - Since the low of 1937, the losses increased steadily until 1941 when a sharp drop occurred.

B. The 1942 Infestation (Partial Record)

1. Primary insect - Western pine beetle in ponderosa pine.
2. Probable trend - Upward from 1941 with the losses about 36 percent higher than 1941.
3. Recommendations- Control work not recommended. Portions of the reservation are being opened to selective logging operations.

REPORT OF PINE BEETLE SURVEYS ON THE WARM SPRINGS INDIAN RESERVATION, OREGON SEASONS OF 1941 AND 1942

In order that no gap shall exist in the series of reports covering the pine beetle surveys on the Warm Springs Indian Reservation, a summary of the surveys of 1941 and 1942 is herewith presented. Preceding reports for this Reservation have been prepared by Mr. Harold Weaver, now Forest Supervisor of the Colville Indian Reservation.

The 1941 survey, consisting of a one hundred percent cruise of ten 640-acre check plots, was made during the period from September 15 to 25, 1941 by Messrs. Chester, Courtney, Danzuka, Gilbert, and Swartz of the Indian Service, and Messrs. Johnson, Zito, and the writer of the Bureau of Entomology and Plant Quarantine.

For the 1942 survey, it was decided to reduce the number and size of the check plots, because of a shortage of funds and manpower, to a number commensurate with that of the other forests in the pine region. Consequently, seven 320-acre check plots were selected as being representative of conditions on the Reservation. A one hundred percent cruise was made on these plots by Messrs. Briggs, Chester, Courtney, and Welter of the Indian Service and Mr. Hess, and the writer of the Bureau of Entomology and Plant Quarantine during the period from October 19 to 27, 1942. In addition to the regular cruise of insect-killed trees, a ten percent cruise of the green ponderosa pine stand on the check plots was made by the random quarter-acre circular plot method, in which, trees above 9.5 inches DBHOB were tallied by diameter and the California system of rating current tree health. The results of this cruise are given in table 1.

RESULTS OF THE SURVEY

Losses in 1940

The 1941 survey completed the loss records for 1940 and gave preliminary data for 1941. Gross 1940 check plot losses averaged 204 board feet per acre or 1.80 percent of the stand (Table 2). The insect-killed trees were found singly and in groups varying from two to twelve or more trees per group. Marked increases were recorded on 7 of the 9 virgin check plots, with an infestation of the "severe epidemic" to the "very severe epidemic" type found generally over the Reservation.

As a result of the 1940 survey, direct control work was recommended for the winter of 1940-1941 and, as reported by Mr. Weaver, a total of 5,980 trees amounting to 3,749,000 board feet were treated on 26,040 acres at a cost of $21,534.78 during that winter.

Estimates of gross losses for the Reservation as a whole, prepared by Mr. Weaver, showed that approximately 32 million board feet of ponderosa pine were killed in 1940. This mortality was equal to 98 board feet per acre or 1.5 percent of the stand (Table 4).

Losses in 1941

Gross western pine beetle losses in 1941 on the Warm Springs Indian Reservation dropped markedly and, as evidenced by the completed check plot survey of 1942, averaged 54 percent lower than those of 1940 (Table 3). This meant 1941 plot mortality amounted to 93 board feet per acre or .75 percent of the stand, with a reduction found on all the virgin check plots ranging from 25 to 82 percent below the 1940 level. In spite of this improved condition, the losses on 2 of the 6 check plots (#5 and #14) were classed as being "severe epidemic" and were at the rate of 160 trees per section and 164 and 100 board feet per acre respectively.

No control work was recommended for the winter of 1941-1942; however, a total of 470 trees were treated by the "peel-peel-burn" method on seven sections in the vicinity of Sidwalter Buttes during the winter.

Approximately 20 million board feet of ponderosa pine were killed over the Reservation as a whole in 1941. This gross mortality was estimated to be equal to 62 board feet per acre or 0.9 percent of the stand (Table 4).

Indicated 1942 Losses

The probable 1942 losses, based on partially completed surveys, indicate that the trend of pine beetle losses has again turned upward. The check plot losses are estimated to be 36 percent higher than the 1941 level. Increases were found on 5 of the 6 virgin plots, with the losses averaging 126 board feet per acre or 1.06 percent of the stand (Table 3).

Infestation Trend

The trend of the estimated total western pine beetle losses on the Warm Springs Indian Reservation is shown in figure 1. Contrary to the trend on other forests in the pine region, the losses on this Reservation peaked in 1934 instead of in 1932. From this high, the losses declined to a low in 1936 and 1937. Since 1937 they have increased steadily until 1941, when a sharp drop occurred. The 1941 losses are estimated to be about equal to the lows of 1936 and 1937.

RECOMMENDATIONS

Even though the trend of pine beetle losses turned abruptly upward in 1942, no direct control work was deemed necessary. The opening up of portions of the Reservation to selective logging operations has been a forward step and should be of considerable aid in reducing part of the annual wasteful drain in these pine stands. The Bureau of Entomology and Plant Quarantine of the Department of Agriculture, through its field offices in Portland, Oregon and Berkeley, California, is always ready to be of assistance in determining the areas and types of trees most susceptible to insect attack.

Table 1. Results of 1942 ten percent cruise of ponderosa pine on survey check plots on the Warm Springs Indian Reservation.*

Check Plot					Site Quality **	Green Stand***		Standing Snags***	
Area	No.	Location Twp.	Rge.	¼ Sec.		No. Trees	Volume (Board feet)	No. Snags	Volume (Board feet)
Old Mill	1	8S	10E	9W	IV+	7,500	4,573,000	600	398,000
Bear Springs	5	6S	11E	19S	IV	6,900	3,391,000	1,200	623,000
Ryans Road	6	9S	10E	15E	IV	5,200	2,863,000	1,000	648,000
Miller Flat	7	9S	11E	8W	V+	6,600	2,398,000	1,100	486,000
Twin Butte	12	10S	10E	5W	III	7,400	5,805,000	1,100	771,000
Metolius Bench	14	10S	11E	32W	IV-	10,200	4,839,000	1,700	996,000
Tenino Bench	20	10S	11E	4S	V+	4,400	1,568,000	900	359,000

* 10% cruise made by ¼-acre random circular plot method. Each spotter established and cruised 1 plot per tally.
** Site quality determined from height curve based on diameter measured with tape and total height measured with an Abney level.
*** Number of ponderosa pine trees and free-standing snags above 9.5 inches D.B.H.O.B. Volumes computed from local volume table prepared for various site quality classes. The standing snags represent an approximate 10 year loss.

Table 2. Ponderosa pine timber killed on survey check plots on the Warm Springs Indian Reservation — Results of the 1941 survey.

Unit	Check Plot No.	Location			Timbered Acres	1940 Losses				
		Twp.	Rge.	Sec.		No. Trees	Gross Volume (Bd. Ft.)* Total	Per Acre	Percent of Stand	Ratio to 1937
Old Mill	1	8S	10E	9	556	261	185,000	332	2.15	1.56
He He Butte	4	7S	11E	18	640	217	141,000	220	3.00	1.31
Bear Springs	5	6S	11E	19	624	242	160,000	256	2.20	1.98
Ryans Road	6	9S	10E	15	640	157	104,000	162	1.50	1.35
Miller Flat	7	9S	11E	8	602	316	123,000	204	3.30	2.02
Tenino Bench	11	10S	11E	29	490	222	122,000	250	3.30	.95
Twin Butte	12	10S	10E	5	640	119	121,000	189	1.20	.66
Metolius Bench	14	10S	11E	32	620	212	85,000	137	1.80	1.52
Lookout Butte	16	9S	9E	2	640	118	77,000	120	.60	1.26
Tenino Burn	20	10S	11E	4	600	273	95,000	158	3.00	.78
Plot Totals**					5,452	1,864	1,118,000	204	1.80	1.28

* Volumes have been estimated.

** Not including Tenino Burn Plot #20. This plot has been burned over and the losses are not comparable to those on the other check plots.

Table 3. Ponderosa pine timber killed on survey check plots on the Warm Springs Indian Reservation — Results of the 1942 survey.

Check Plot*		1941 Losses					1942 Losses						
			Gross Volume (Bd. Ft.)				Partial Losses			Estimated Total Losses Gross Volume (Bd. Ft.)			
Unit	No.	No. Trees	Total	Per Acre	Percent of Stand	Ratio to 1940	Date of Cruise	No. Trees	Volume (Bd.Ft.)	No. Trees	Total	Per Acre	% of Stand	Ratio to 1941
Old Mill	1	24	17,160	54	.38	.18	10/26/42	25	17,660	32	22,000	69	.48	1.28
Bear Springs	5	80	52,430	164	1.54	.65	10/22/42	60	36,900	79	48,000	150	1.42	.92
Ryans Road	6	42	27,910	87	.97	.54	10/23/42	53	26,100	69	34,000	106	1.19	1.22
Miller Flat	7	47	18,260	57	.76	.29	10/27/42	78	32,490	100	41,000	131	1.71	2.24
Twin Butte	12	30	30,500	95	.53	.50	10/21/42	37	48,370	49	64,000	200	1.10	2.10
Metolius Bench	14	80	32,040	100	.66	.75	10/20/42	62	25,200	83	24,000	106	.70	1.06
Tenino Burn	20	67	23,420	73	1.50	.48	10/24/42	70	27,260	90	35,000	109	2.24	1.49
Plot Totals**		303	178,300	93	.75	.46		315	186,720	412	243,000	126	1.02	1.36

* Each plot is @20 acres.

** Not including the Tenino Bench Plot #20. This plot has been burned over and the losses are not comparable to those on the other check plots.

Table 4. Estimated gross insect-caused ponderosa pine mortality in 1940 and 1941 — Warm Springs Indian Reservation

Year	Ponderosa Pine Type		Estimated Gross Ponderosa Pine Mortality				
			Trees		Volume (BM)		
	Acreage	Volume (BM)	Total	Per Section	Total	Per Acre	Percent of Stand
1940	325,000	2,166,000,000	51,000	100	32,000,000	98	1.5
1941	325,000	2,134,000,000	30,000	59	20,000,000	62	0.9

FIGURE 1

TREND OF GROSS WESTERN PINE BEETLE LOSSES
WARM SPRINGS INDIAN RESERVATION
1932-1941